

Endodontic Management of a Rare Anomaly of Paramolar Tubercle Fused With Maxillary Second Molar Using CBCT- A Case Report

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Abstract: Different kind of morphological variations may be seen in the human teeth that may vary from anomalous cusps in the crown to additional number of roots. In permanent molars, changes in the crown morphology may occur either in the form of an additional tooth (paramolar) or supernumerary cusp termed as "paramolartubercle". These structures pose clinical problems such as crowding, retention or ectopic eruptions of adjacent teeth, dental caries, gingivitis or periodontitis, interference in orthodontic banding, laceration of the buccal mucosa due to its buccal position etc. Such unusual and complex anatomy makes endodontic treatment challenging. Hence, it is considered important to have thorough knowledge of variations in tooth/canal anatomy. For a successful treatment outcome, careful interpretation of angled radiographs and proper access preparation are essential prerequisites. CBCT should be used as an adjunctive tool for diagnosis such complicated anatomy.

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I. Introduction

Different kind of morphological variations may be seen in the human teeth that may vary from anomalous cusps in the crown to additional number of roots. In permanent molars, changes in the crown morphology may occur either in the form of an additional tooth (paramolar)¹ or supernumerary cusp termed as "paramolar tubercle".² Bolk (1916) was the first who termed an additional cusp occurring on the buccal surfaces of both upper and lower molars as "paramolar tubercle".³

Dahlberg (1945) introduced a more specific paleontologist nomenclature when he termed this entity as "parastyle" when present in the upper molars and as "protostylid" when present in the lower molars.⁴ Paramolars has been reported in both deciduous and permanent molars. These are usually present on the buccal surface of the mesiobuccal cusp (paracone) of the upper molars. Rare cases has been reported, in which paramolar is present on the distobuccal cusp (metacone) of the upper molars and the buccal surfaces of the upper premolars.⁵

Again Dahlberg in 1950, clearly defined it as any style anomalous cusp, supernumerary inclusion or eminence occurring on the buccal or lingual surfaces of both upper and lower premolars and molars.²

The etiology is unknown for supernumerary cusp formation or abnormal shape. Still, it was suggested that these are probably due to hyperactivity of the primary dental lamina.⁶ Another theory hypothesized that genetic nature (PAX and MSX genes) are responsible for the abnormal shape of the teeth.⁷ Turner and Scott suggested that these cusps arise during the morpho differentiation stage of tooth development arise from an accessory enamel knot at the buccal surface of the paracone of upper molars.⁸

This kind of unusual and complex anatomy makes endodontic treatment challenging. Hence, it is considered important to have thorough knowledge of variations in tooth/canal anatomy. For a successful treatment outcome, careful interpretation of angled radiographs, proper access preparation and a detailed

exploration of the interior of the tooth are essential prerequisites. CBCT should be used as an adjunctive tool for diagnosis such complicated anatomies.

The purpose of this article is to report the successful endodontic treatment of a maxillary second molar fused to paramolar tubercles using CBCT and Endo-Vac irrigation system as adjunctive aids.

II. Case Report

A 27-year-old male patient was referred to the Department of Endodontics, King George's Medical University, Lucknow with the chief complaint of continuous severe pain in the right upper back tooth region for the past 3 days. Family and medical histories were non-contributory. Preoperative radiograph revealed no carious lesion but there was some variation seen in the tooth. Upon intra oral examination, no soft-tissue abnormalities were observed except mild gingivitis in relation to tooth 17. Tooth was tender on percussion and showed unusual crown morphology with a paramolar tubercle fused between the mesiobuccal and distobuccal cusp.

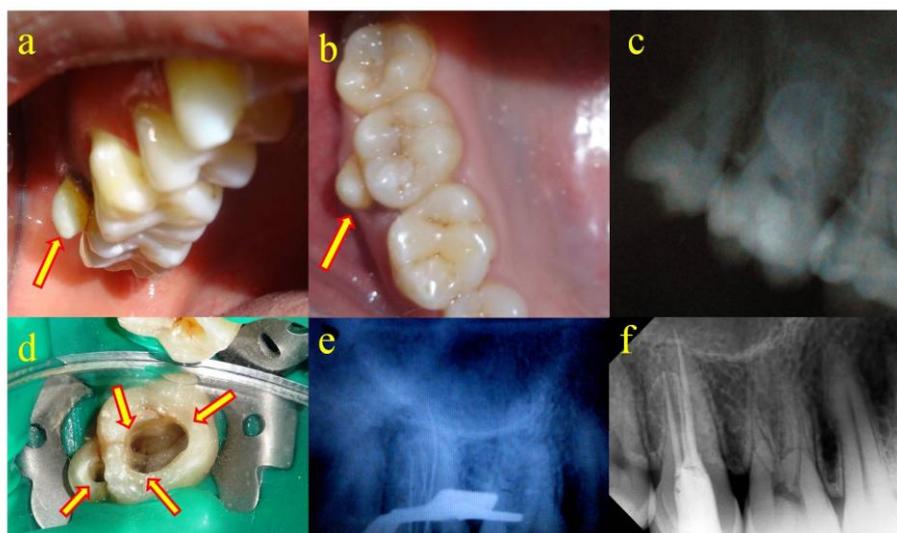


Figure 1: a-b. Preoperative photograph of tooth 17 and the fused paramolar tubercle
c. Preoperative radiograph of tooth 17 d. Access opening showing the three root canal orifices in tooth 17 and a separate orifice in the fused paramolar tubercle e. Working length radiograph f. Post-obturation radiograph of tooth 17

A deep developmental groove was seen between paramolar tubercle and its normal counterpart. Pulp vitality tests like cold test and EPT test showed a negative response. Based on clinical and radiographic evaluation, diagnosis of pulpal necrosis with apical periodontitis was made.

After administration of local anesthetics (Xylocaine; AstraZencaPharmaInd Ltd, Bangalore, India), the tooth was isolated with rubber dam. Then, conventional endodontic access cavity was prepared using Endo access bur #2 and Endo Z bur (Dentsply, Tulsa, Tulsa, OK) in tooth 17 and its fused counterpart. After access preparation, pulp chamber was explored using a DG-16 explorer (Hu-Friedy, Chicago, USA). Three canals were located with #10 size k file; namely, the mesi-obuccal (MB), distobuccal (DB), and palatal canal (P) and a separate canal in the fused paramolar tubercle.

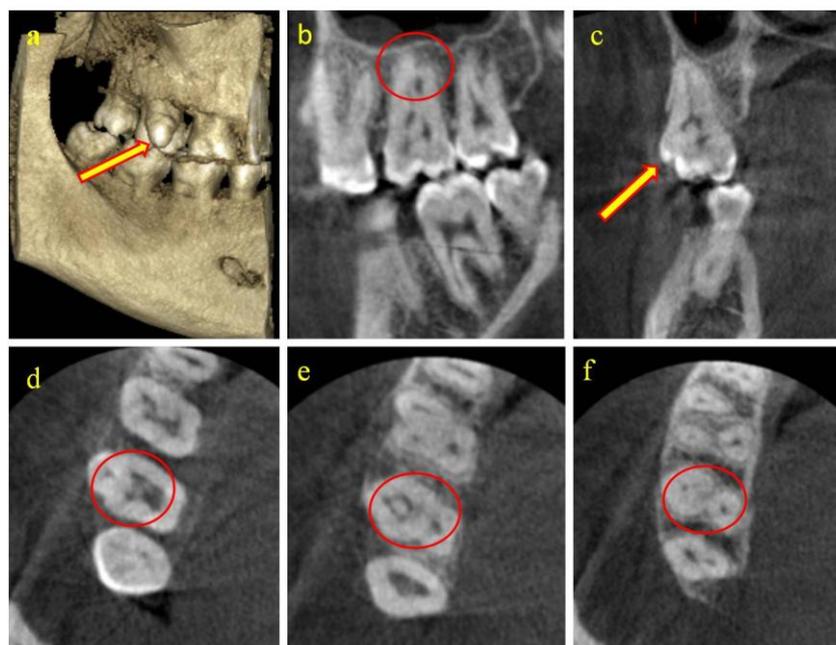


Figure 2: a. CBCT image showing paramolar tubercle fused with tooth 17 b. CBCT image showing two roots instead of three roots c. CBCT image showing pulpal communication between paramolar tubercle fused with tooth 17 d-f. Enlarged axial section CBCT images of tooth 17 at the (2d) cervical (2e) middle where MB,DB and canal of paramolar tubercle are fused and (2f) apical level showing fusion between the root canals with single portal of exit.

To know whether the communication existed between the canals, a CBCT analysis was performed with the patient's consent. The three dimensional reconstructed CBCT images of tooth 17 revealed the presence of two roots instead of three roots. One large conical buccal root (formed due to the fusion between the mesiobuccal root, distobuccal root and the root of the paramolar tubercle) and another one is palatal root. Axial images revealed fusion between the canal of paramolar tubercle, mesiobuccal canal and distobuccal canal at the middle third level with a single portal of exit. The working length was determined using an apex locator (IPEX, NSK Dental equipments, Japan) and later confirmed radiographically. Cleaning and shaping was performed using ProtaperNiTi rotary instruments (DentsplyMaillefer) in a crown down manner. Irrigation was done with normal saline, 2.5% of sodium hypo-chlorite and 17% EDTA. Further debridement of the communication between the root canals was done using EndoVac (apical negative pressure irrigation system) (Discus Dental, Culver City, CA) with 2.5% NaOCl and 17% EDTA. After that canals were dried and medicated with calcium hydroxide (RC Cal, Prime Dental products, Mumbai, India) and the access cavity was sealed with Cavit (3M ESPE AG, Seefeld, Germany).

In the subsequent appointment, patient remained asymptomatic. Calcium hydroxide was removed and the canals were irrigated with 17% EDTA and final flushing with saline. Canals were dried with paper points and obturation was performed using cold lateral compaction technique with F1 and F2 guttapercha points and AH plus sealer (MailleferDentsply, Konstanz, Germany).

Access cavity was restored with composite restoration (Z100; 3M ESPE Dental Products, St Paul, MN) and the patient was recalled after one week for evaluation and the patient was asymptomatic.

III. Discussion

Variation in the anatomy of the canal of the maxillary second molar has been reported earlier. Fusion of the molar with the paramolar tubercle is particularly rare and there are only very few case reports on the successful endodontic management of such cases. Presence of a deep groove between the supernumerary and its permanent counterpart is highly susceptible to caries and can also sometimes extend sub-gingivally leading to periodontal breakdown. Moreover, fused teeth might contain either separate root canals or share a common root canal, which makes treatment planning complicated.

Paramolar tubercles are considered as non-metric dental traits which are the structurally characteristics expressed within certain biological and geographical affiliations. These structures can be considered as normal morphological features of the dentition and not classified as anomalous structurally because of their low occurrence and very little information about these structures. The Paramolars are reported to be infrequent among Africans, Europeans, and their descendants in America, while in a group of native Americans from the

southwest (Pima) paramolars are much more common.⁶ Similarly, no cusp formation was observed among whites, Negroes, Filipinos, and Hawaiians. While as Southwestern Indians showed a higher occurrence in both deciduous and permanent molars compared with other populations.⁵

The prevalence rate of parastyle in the upper second molars is 0.4% to 2.8% making our case a very rare presentation. Whereas it is 0% to 0.1% in upper first molars and 0% to 4.7% in the upper third molars in all the given populations.^{5,9-10} They usually present unilaterally in the permanent dentition as seen in the presented cases.

Axial CBCT sections were obtained to determine internal canal anatomy that was not clearly evident with periapical radiographs. A major advantage of CBCT provides three dimensional accuracy and elimination of superimposition of anatomical structures when compared to conventional radiographs.¹¹

In this case report, true pulpal communication was confirmed using CBCT which showed the root canal of the paramolar tubercle was fused with the MB and DB at the middle third below the cemento-enamel junction (CEJ) and they had a single portal of exit. Cleaning and shaping was done using ProtaperNiTi rotary system. Additional disinfection of the root canal system was performed using Endo-Vac according to the manufacturer's instructions. EndoVac is a true apical negative pressure system that draws fluid apically by evacuation.¹²

IV. Conclusion

Sometimes treatment of rare features which are deviations from normal can be challenging, but the inability to find such anomalies may cause failures. The evaluation of CBCT images can result in better understanding of root canal anatomy, which enables the clinician to investigate the root canal system and to clean, shape, and obturate it more efficiently. EndoVac irrigation system is very useful in cleaning the communications for successful endodontic management of unusual anatomies like paramolar tubercles fused with maxillary second molars.

Abbreviation

CBCT: Cone Beam Computed Tomography

EDTA: Ethylene diamine tetra acetic acid

The use of acronyms and abbreviations is discouraged and should be kept to a minimum. When used, they are to be defined where first used, followed by the acronym or abbreviation in parentheses

Conflict Of Interest

No potential conflict of interest relevant to this article was reported.

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